HALO Smart IoT

case study

Halo Smart IoT helps Welsh housing authorities to win millions in government grants

Welsh Council is actively participating in the Government's Optimised Retrofit Programme (ORP), aiming to improve the energy efficiency of housing stock and reduce fuel poverty. As part of this initiative, we provide pre- and post-installation validation to ensure that retrofit measures deliver the expected results in energy savings, comfort, and indoor environmental quality.

Key Benefits for Welsh Council

- Validate the performance of retrofit measures before and after installation
- Provide data to support funding applications (e.g., £10M+ from government grants)
- Ensure that Energy Performance Certificates (EPCs) improve from E/F ratings to at least C
- Monitor and improve indoor air quality and comfort
- Reduce fuel poverty and assess long-term benefits to tenants

Optimised Retrofit Programme – Pre- and Post-Validation of Retrofit Measures

North Wales (7 towns, ~600 residential properties)

Halo Smart IoT provides a data-driven monitoring solution using our multi-sensor "Four-in-One" technology to collect and analyse key environmental metrics over time, both before and after retrofit works.

Metrics Monitored

- Indoor temperature
- Humidity levels
- CO_2 (ventilation effectiveness)
- Electricity and gas consumption
- Loft temperature (to validate insulation performance)

Approach

Baseline Monitoring (Pre-retrofit)

Sensors are installed to capture real-time environmental and energy data, establishing a performance baseline.

Retrofit Works Implemented, measures typically include:

- Roof, wall, and loft insulation
- New windows and doors
- Boiler upgrades or installation of air source heat pumps
- Solar PV systems
- Mechanical ventilation systems with heat recovery (MVHR)

Post-Installation Monitoring

Data is collected for up to three years post-installation to assess the long-term impact and efficiency of each measure.

Outcomes and values

Performance Validation	The council can confidently confirm that the measures are working as intended - proving return on investment and meeting grant conditions.
Tenant Wellbeing	Monitoring ensures properties remain within healthy temperature and humidity ranges, reducing the risk of damp and mould.
Energy Insights	Councils gain visibility into whether systems like solar panels or heat pumps are genuinely delivering promised benefits (e.g., reductions in electricity bills).
Loft Insulation Efficiency	Data shows if loft temperatures are close to outside air temperature, confirming insulation is effective.
Gas/Electricity Trends	Changes in consumption patterns are used to validate system efficiency and tenant savings.

Multi-sensor 4-in-1 technology collects and analyses key indoor environmental metrics

Improvements

Compliance & Funding Justification

Data supports ongoing and future government funding applications.

Targeted Improvements

The council refines retrofit strategies based on real-world results.

Risk Reduction

Monitoring reduces the chance of future health issues from poor ventilation or excess moisture.

Evolving Focus

Initially, the technology was deployed purely for validating retrofit installations. However, recent priorities have shifted toward using the same data for proactive tenant wellbeing management, especially related to damp and mould risk. Councils are now using the solution to:

- Spot and resolve indoor air quality issues
- Identify when installed systems (e.g., MVHR) are underperforming
- Avoid false callouts and address real issues quickly

Looking Ahead

With retrofit validation now firmly embedded into council processes, the focus is expanding into a hybrid model:

- Continued performance validation for retrofit funding
- Ongoing tenant risk monitoring for healthier, more sustainable homes

Halo Smart IoT continues to work with Councils and local authorities across Wales, helping ensure energy efficiency investments deliver measurable, long-term impact.